WHAT IS CLAIMED IS:

1. A system for refrigerating at least one enclosure comprising:

at least one air-to-liquid heat exchanger capable of placing a coolant in a first coolant loop in thermal communication with at least one interior of the at least one enclosure such that the coolant can carry heat away from the at least one interior; and

an eutectic thermal battery including a phase change material, wherein the eutectic thermal battery is capable of receiving the coolant from the at least one air-to-liquid heat exchanger and thereafter placing the coolant in thermal communication with the phase change material such that the phase change material can absorb the heat carried away by the coolant in the first coolant loop.

2. A system according to Claim 1 further comprising a first pump capable of driving the coolant in the first coolant loop.

3. A system according to Claim 1, wherein the first coolant loop is a closed loop such that the at least one air-to-liquid heat exchanger is capable of receiving the coolant from the eutectic thermal battery after the phase change material absorbs the heat carried away by the coolant.

4. A system according to Claim 1, wherein the heat absorbed by the phase change material is capable of being carried away by a coolant in a second coolant loop, and wherein the system further comprises a liquid-to-direct heat exchanger capable of receiving the coolant in the second coolant loop such that a cold heat sink in thermal communication with the liquid-to-direct heat exchanger can absorb the heat carried by the coolant.

5. A system according to Claim 4 further comprising a second pump capable of driving the coolant in the second coolant loop.

6. A system according to Claim 4, wherein the second coolant loop is a closed loop such that the eutectic thermal battery is capable of receiving the coolant from the liquid-to-direct heat exchanger after the cold heat sink absorbs the heat carried away by the coolant.

7. A system according to Claim 4, wherein the cold heat sink comprises at least a portion of an aircraft fuselage skin structure, and wherein the liquid-to-direct heat exchanger is shaped based upon a contour of at least a portion of the fuselage skin structure.

8. A system according to Claim 1 further comprising a store of a pressurized inert composition, wherein the eutectic thermal battery includes an evaporator coil in thermal contact with the phase change material and in variable fluid contact with the store, wherein the pressurized inert composition is capable of being expanded into the evaporator coil such that the inert composition is capable of carrying away the heat absorbed by the phase change material.

9. A system for refrigerating at least one enclosure comprising:

at least one air-to-liquid heat exchanger capable of placing a coolant in a coolant loop in thermal communication with at least one interior of the at least one enclosure such that the coolant can carry heat away from the at least one interior; and

at least one liquid-to-direct heat pump capable of rejecting the heat carried by the coolant in the coolant loop; and

a cold heat sink in thermal communication with the at least one liquid-to-direct heat pump, wherein the cold heat sink is capable of receiving the heat rejected by the at least one liquid-to-direct heat pump, and wherein the cold heat sink comprises at least a portion of an aircraft fuselage skin structure.

10. A system according to Claim 9 further comprising:

at least one pump capable of driving the coolant in the coolant loop.

11. A system according to Claim 9, wherein the coolant loop is a closed loop such that the at least one air-to-liquid heat exchanger is capable of receiving the coolant from the at least one liquid-to-direct heat pump after the at least one liquid-to-direct heat pump rejects the heat to the cold heat sink.

12. A system for refrigerating at least one enclosure comprising:

an eutectic thermal battery including a phase change material, wherein the phase change material is capable of absorbing heat carried away from at least one

interior of the at least one enclosure, and wherein the eutectic thermal battery is capable of receiving a coolant from a second coolant loop and thereafter placing the coolant in thermal communication with the phase change material such that the coolant can absorb heat from the phase change material; and

at least one liquid-to-direct heat pump capable of rejecting the heat carried by the coolant in the second coolant loop to a cold heat sink in thermal communication with the at least one liquid-to-direct heat pump.

13. A system according to Claim 12 further comprising a second pump capable of driving the coolant in the second coolant loop from the eutectic thermal battery to the at least one liquid-to-direct heat pump.

14. A system according to Claim 12, wherein the second coolant loop is a closed loop such that the eutectic thermal battery is capable of receiving the coolant from the at least one liquid-to-direct heat pump after the at least one liquid-to-direct heat pump rejects the heat carried by the coolant to the cold heat sink.

15. A system according to Claim 12, wherein the cold heat sink comprises at least a portion of an aircraft fuselage skin structure.

16. A system for refrigerating at least one enclosure comprising:

at least one air-to-liquid heat exchanger capable of placing a coolant in a coolant loop in thermal communication with at least one interior of the at least one enclosure such that the coolant can carry heat away from the at least one interior;

a liquid-to-direct heat exchanger capable of receiving the coolant in the coolant loop; and

a cold heat sink in thermal communication with the liquid-to-direct heat exchanger, wherein the cold heat sink is capable of absorbing the heat carried by the coolant received by the liquid-to-direct heat exchanger, and wherein the cold heat sink comprises at least a portion of an aircraft fuselage skin structure.

17. A system according to Claim 16 further comprising:

at least one pump capable of driving the coolant in the coolant loop.

18. A system according to Claim 16, wherein the coolant loop is a closed loop such that the at least one air-to-liquid heat exchanger is capable of receiving the coolant from the liquid-to-direct heat exchanger after the the cold heat sink absorbes the heat carried by the coolant.

19. A system for refrigerating at least one enclosure comprising:

at least one air-to-liquid heat exchanger in thermal communication with at least one interior of the at least one enclosure;

an eutectic thermal battery in fluid communication with the at least one air-to-liquid heat exchanger via a first coolant loop;

a liquid-to-direct heat exchanger in fluid communication with the eutectic thermal battery via a second coolant loop, and in thermal communication with a cold heat sink; and

at least one liquid-to-direct heat pump in fluid communication with the eutectic thermal battery via the second coolant loop, and in thermal communication with the cold heat sink,

wherein the system is capable of controllably operating in at least one of a direct passive mode, an indirect passive mode, a direct active mode and an indirect active mode whereby a coolant is capable of selectively flowing in at least one of the first and second coolant loops through at least one of the at least one air-to-liquid heat exchanger, the eutectic thermal battery, the liquid-to-direct heat exchanger and the at least one liquid-to-direct heat pump.

20. A system according to Claim 19, wherein when the system operates in the direct passive mode the at least one air-to-liquid heat exchanger is capable of placing the coolant in thermal communication with at least one interior such that the coolant can carry heat away from the at least one interior.

21. A system according to Claim 20, wherein when the system operates in the direct passive mode the liquid-to-direct heat exchanger is capable of receiving the coolant such that the cold heat sink in thermal communication with the liquid-to-direct heat exchanger can absorb the heat carried by the coolant.

22. A system according to Claim 21 further comprising a plurality of valves capable of controlling the flow of coolant in the first and second coolant loops.

23. A system according to Claim 21, wherein when the system operates in the indirect passive mode the at least one air-to-liquid heat exchanger is capable of placing the coolant in the first coolant loop in thermal communication with at least one interior such that the coolant can carry heat away from the at least one interior.

24. A system according to Claim 23, wherein when the system operates in the indirect passive mode the eutectic thermal battery is capable of receiving the coolant from the at least one air-to-liquid heat exchanger and thereafter absorbing the heat carried away by the coolant.

25. A system according to Claim 24, wherein when the system operates in the indirect passive mode the liquid-to-direct heat exchanger is capable of receiving the coolant in the second coolant loop such that the cold heat sink in thermal communication with the liquid-to-direct heat exchanger can absorb the heat carried by the coolant.

26. A system according to Claim 21, wherein when the system operates in the direct active mode the at least one air-to-liquid heat exchanger is capable of placing the coolant in the first coolant loop in thermal communication with at least one interior such that the coolant can carry heat away from the at least one interior.

27. A system according to Claim 26, wherein when the system operates in the direct active mode the at least one liquid-to-direct heat pump is capable of rejecting the heat carried by the coolant in the first coolant loop to the cold heat sink.

28. A system according to Claim 26 further comprising a store of a pressurized inert composition, wherein the eutectic thermal battery includes an evaporator coil in variable fluid contact with the store, wherein when the system operates in the direct active mode the eutectic thermal battery is capable of receiving the coolant from the at least one air-to-liquid heat exchanger and thereafter absorbing the heat carried away by the coolant in the first coolant loop, and the pressurized inert

composition is capable of being expanded into the evaporator coil to thereby carry away the heat absorbed by the eutectic thermal battery.

29. A system according to Claim 21, wherein when the system operates in the indirect active mode coolant in the second coolant loop is capable of being placed in thermal communication with the eutectic thermal battery such that the coolant carries heat away from the eutectic thermal battery.

30. A system according to Claim 29, wherein when the system operates in the indirect active mode the at least one liquid-to-direct heat pump is capable of rejecting the heat carried by coolant in the second coolant loop.

31. A system according to Claim 21 further comprising a store of a pressurized inert composition, wherein the eutectic thermal battery includes an evaporator coil in variable fluid contact with the store, and wherein the pressurized inert composition is capable of being expanded into the evaporator coil.

32. A method of refrigerating at least one enclosure comprising:

refrigerating at least one interior of the at least one enclosure in a plurality of consecutive modes comprising at least a direct passive mode, an indirect passive mode, a direct active mode and an indirect active mode, wherein the mode of refrigerating is selected at least partially based upon a temperature of a phase change material, and wherein refrigerating the at least one interior in the indirect passive mode comprises:

placing a coolant in a first coolant loop in thermal communication with the at least one interior such that the coolant carries heat away from the at least one interior;

absorbing the heat carried away by the coolant in the first coolant loop, wherein the heat is absorbed by the phase change material;

placing a coolant in a second coolant loop in thermal communication with the phase change material such that the coolant carries away the absorbed heat; and

placing the coolant in the second coolant loop in thermal communication with a cold heat sink such that the cold heat sink absorbs the heat carried by the coolant.

33. A method according to Claim 32, wherein refrigerating the at least one interior in the direct passive mode comprises:

placing a coolant in the first coolant loop in thermal communication with the at least one interior such that the coolant carries heat away from the at least one interior;

receiving the coolant into the second coolant loop and thereafter placing the coolant in the second coolant loop in thermal communication with the cold heat sink such that the cold heat sink absorbs the heat carried by the coolant, wherein the cold heat sink comprises at least a portion of an aircraft fuselage skin structure.

34. A method according to Claim 32, wherein refrigerating the at least one interior in the direct active mode comprises:

placing the coolant in the first coolant loop in thermal communication with the at least one interior such that the coolant carries heat away from the at least one interior; and

rejecting the heat carried by the coolant in the first coolant loop to the cold heat sink.

35. A method according to Claim 34, wherein refrigerating the at least one interior in the indirect active mode comprises:

placing the coolant in the second coolant loop in thermal communication with the phase change material such that the coolant carries away heat from the phase change material; and

rejecting the heat carried by the coolant in the second coolant loop to the cold heat sink.

36. A method according to Claim 34, wherein refrigerating the at least one interior in the direct active mode comprises:

placing the coolant in the first coolant loop in thermal communication with the at least one interior such that the coolant carries heat away from the at least one interior;

absorbing the heat carried away by the coolant in the first coolant loop, wherein the heat is absorbed by the phase change material; and

expanding a pressurized inert composition into thermal communication with the heat absorbed from the coolant in the first coolant loop such that the inert composition carries away the absorbed heat.

37. A system for refrigerating at least one enclosure comprising:

at least one air-to-liquid heat pump capable of placing a coolant in a coolant loop in thermal communication with at least one interior of the at least one enclosure such that the at least one air-to-liquid heat pump can reject heat from the at least one interior to the coolant to thereby permit the coolant to carry the heat away from the at least one interior;

a liquid-to-direct heat exchanger capable of receiving the coolant in the coolant loop; and

a cold heat sink in thermal communication with the liquid-to-direct heat exchanger, wherein the cold heat sink is capable of absorbing the heat carried by the coolant received by the liquid-to-direct heat exchanger, and wherein the cold heat sink comprises at least a portion of an aircraft fuselage skin structure.

38. A system for refrigerating at least one enclosure at a predetermined rate of cooling, the system comprising:

a heat sink in thermal communication with the at least one enclosure;

at least one air-to-liquid heat exchanger capable of placing a coolant in a first coolant loop in thermal communication with at least one interior of the at least one enclosure via the heat sink such that the coolant can carry heat away from the at least one interior and thereby cool the at least one enclosure at the predetermined rate of cooling; and

at least one air-to-liquid heat pump capable of placing a coolant in a second coolant loop in thermal communication with the at least one interior of the at least one enclosure via the heat sink such that the at least one air-to-liquid heat pump can reject heat from the at least one interior to the coolant to thereby permit the coolant to carry the heat away from the at least one interior and thereby cool the at least one enclosure at the predetermined rate of cooling,

wherein the heat sink has a cooling capacity of less than about 150% of a cooling capacity required for cooling the at least one enclosure at the predetermined rate of cooling.

39. A system according to claim 38, further comprising a eutectic thermal battery including a phase change material, wherein the eutectic thermal battery is capable of receiving the coolant from each air-to-liquid heat exchanger and air-to-liquid heat pump and thereafter placing the coolant in thermal communication with the phase change material such that the phase change material can absorb the heat carried away by the coolant in the first and second coolant loops.

40. A system according to claim 38, further comprising:

a liquid-to-direct heat exchanger capable of receiving the coolant in the first and second coolant loops; and

a cold heat sink in thermal communication with the liquid-to-direct heat exchanger, wherein the cold heat sink is capable of absorbing the heat carried by the coolant received by the liquid-to-direct heat exchanger, and wherein the cold heat sink comprises at least a portion of an aircraft fuselage skin structure.